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pg 3932
10/10/03

HAI

HARRISON A/E, INC.
226 Stonewall Road
Baltimore, Maryland 21228-5443, USA

FACSIMILE TRANSMISSION COVER SHEET

Date: September 17, 2003

TO: Ms. Kimberly T. Wood, Patent Examiner
Fax: 1.703.308.3686
Telephone: 1.703.308.0539; email:
Reference: Serial number 10/065,872 Election of Species: # 4

LOCATION: United States Patent and Trademark Office
Commissioner for Patents, Art Unit 3632,
P.O. Box 1450
Alexandria, Virginia 22313-1450

FROM: Wilbur E. Harrison
FAX: 410-747-9936
TELEPHONES: 0: 410-747-9935; H: 410-747-8325;
email: Harrison@harrison-ae.com
LOCATION: Harrison A/E, Inc.
226 Stonewall Road
Baltimore, Maryland 21228-5443, USA

SUBJECT: Election of Species # 4.

COMMENTS: Please see my attached letter. Thank you.

Sincerely,

Wilbur E. Harrison

Wilbur E. Harrison, P.E.
President

NUMBER OF PA ES INCLUDIN COVER: 2
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HAI

MILITARY PROJECTS, ARCHITECTS, ENGINEERS, CONSTRUCTION MANAGERS, C NTRACT RS

ENTERPRISE SOFTWARE-COMPUTERIZED CORPORATE MANAGEMENT SYSTEMS

RESEARCH AND DEVELOPMENT: MILITARY DEFENSE, MEDICAL AND ENVIRONMENTAL

226 Stonewall Road
Baltimore, Maryland 21228-5443 USA

Internet Sites: http://www.HAIholdings.com;
http://www.enterprisesoftware-ccms.com;
http://www.harrison-ae.com

email: harrison@harrison-ae.com
Telephone: 0:410-747-9935; Fax: 410-747-9936

September 18, 2003

Ms. Kimberly T. Wood
Patent Examiner
United States Patent and Trademark Office, Art Unit 3632
P. O. Box 1450
Alexandria, Virginia 22313-1450

Ms. Wood:

According to my files, I also mailed into the USPTO some attachments, dated 12/9/2002, to my Patent Application. I shall forward these attachments to you by mail, in case they are applicable.

Thank you for your cooperation.

Sincerely,

Wilbur E. Harrison

Wilbur E. Harri on, P.E.
President

HAI

HARRISON A/E, INC.
226 Stonewall Road
Baltimore, Maryland 21228 USA

PATENT ATTACHMENTS

Date Originally Mailed to the USPTO: December 09, 2002

TO: Ms. Kimberly T. Wood, Patent Examiner
United States Patent and Trademark Office
Art Unit 3632
P.O. Box 1450
Alexandria, Virginia 22313-1450

HAI HARRISON A/E, INC.

MILITARY PROJECTS, ARCHITECTS, ENGINEERS, C NSTRUCTI N MANAGERS AND C NTRACT RS

ENTERPRISE SOFTWARE-COMPUTERIZED CORP P RATE MANAGEMENT SYSTEMS

RESEARCH AND DEVELOPMENT: MILITARY DEFENSE, MEDICAL AND ENVIRONMENTAL PRODUCTS

226 Stonewall Road
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Internet Sites: http://www.HAIholdings.com;
http://www.enterprisesoftware-ccms.com;
http://www.harrison-ae.com

email: harrison@harrison-ae.com
Telephones: O:410-747-9935; H: 410-747-8325
Fax: 410-747-9936

December 09, 2002

US DEPARTMENT OF COMMERCE
USPTO
US PATENT AND TRADEMARK OFFICE
Washington, D.C. 20231

Ladies and Gentlemen:

This concerns my Formal Patent Application to the USPTO. Title of Invention: "Harrison Free Standing Towers and Missile Defense System". The application is complete as it stands.

My Application Serial Number is 10/065,872 (Provided by the USPTO Acknowledgement Receipt).

My USPTO code numbers are:
Customer Number: 34341
Authorization Code: LK4W-HZJI-TEQF
Reference Number: 30314891
EFS ID: 20307 (Provided in th USPTO Ackn wledg ment Receipt)

I respectfully requ st that th following Attachments be included with my Utility Pat nt Filing referenced abov . I imply c uld not figure

h w t includ th attached fil s with my lectronic applicati n, so I u ed w rds t c mplete my Pat nt Specifi ati n, a referenced above.

Accordingly, the following attachments are included below:

Attachment A: Bibliography/List of References.
Attachment B: A technical discussion of gyroscopes.
Attachment C: Background Fax to the US Army.
Attachment D: Background Fax and Letter to US ARMY SPACE AND MISSILE DEFENSE COMMAND.

I consider this Patent Application to be very important to the national defense of the USA, as you can see from the attached material.

Would you please confirm receipt at your convenience. Thank you.

Sincerely,

Wilbur E. Harrison, P.E.
President

Microsoft Word; File: 2980M.doc; saved in HD E, CD-RW #1 & CD-R #1.

Attachments

ATTACHMENTS OF APPLICABLE REFERENCED MATERIAL.

ATTACHMENT A

BIBLIOGRAPHY

Arnold, Ronald N., and Leonard Maunder, *Gyrodynamics and Its Engineering Applications*, New York and London: Academic Press, Inc., 1961.

Burger, W., and A. G. Corbet, Ship Stabilizers, *Their Design and Operation in Correcting the Rolling of Ships; A Handbook for Merchant Navy Officers*, London: Pergamon Press Ltd., 1966.

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Richardson, K. I. T., *The Gyroscope Applied*, London: Hutchinson's Scientific and Technical Publications, 1954.

Ross, James F. S., *The Gyroscopic Stabilization of Land Vehicles*, London: Edward Arnold & Co., 1933.

Scarborough, James B., *The Gyroscope, Theory and Applications*, New York and London: Interscience Publishers, 1958.

Schilovsky, P. P., *The Gyroscope: Its Practical Construction and Application*, New York: Chemical Publishing Corp. of N.Y., Inc., 1938.

www.mariner.connectfree.co.uk/html/gyro.htm Website about gyroscopes with diagrams and calculations.

Microsoft Word; Drive E; File: 2980A.doc & Diskette 104.

ATTACHMENT B

[redacted]

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Home / EM

Overview

Gyroscopes are a simple toy to many, yet they are poorly understood. This paper derives the mathematics of gyroscopes, and briefly discusses the relevance to the Plank's equation "E=hv".

Gyroscope concepts

A gyroscope has three axes. First, a *spin* axis, which defines the gyroscope strength or *moment*. Let us call the other two the primary axis and the secondary axis. These three axis are orthogonal to each other.

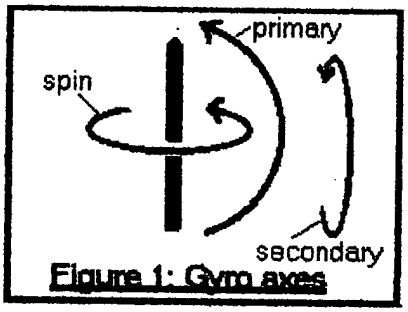


Figure 1: Gyro axes

The spin axis rotates around the vertical line. The primary axis rotates the whole gyroscope in the plane of the page, and the secondary axis rotates the gyroscope up-and-over into the page.

The spin axis is the source of the gyroscopic effect. The primary axis is conceptually the input or driving axis, and the secondary the output. Then if the gyroscope is spun on its spin axis, and a torque is applied to the primary axis, the secondary axis will precess. The primary axis appears infinitely stiff to the applied torque and does not give under it. This is the generally-recognised characteristic of gyroscopic behaviour.

It is important not to confuse the concepts of angular momentum and gyroscopic moment. When a mass 'm' moves in a straight line at velocity '**v**' it exhibits linear momentum (m.**v**). It is trivial to predict that if it is constrained to travel in a radius 'r' it will produce an angular momentum (m.**v**.r). However with the angular momentum an effect that could not have been predicted turns up - gyroscopic behaviour. The fact that in the larger world the two effects occur together and in

simple proportion to each other does not mean that this is always the case - gyroscopic behaviour occurs without angular momentum in electron behaviour, even though the terms 'spin' and 'spin angular momentum' are still used for historical reasons, even though there is no direct evidence that the electron's mass or charge spins on its own axis. It may simply be that rotating an object exposes the gyroscopic moments of the elementary particles that make it up, possibly through the asymmetric relativistic effects created by the centripetal acceleration; some major experimental work is required in this area.

Angular momentum has the form "kilogram-meters^2 per second". Gyroscopic moment has the form "Newton-meters per Hertz", or torque required to produce a precession rate of one Hertz. For those familiar with dimensional analysis, both have the dimensions 'L^2M/T', which means only that they are related by a simple scalar number. However (as far as the author has been able to determine) the actual value has never been researched; it may be unity, it may not. Whatever the case, from here on I will ignore angular momentum and consider only the gyroscopic moment, regardless of how it is generated.

Basic gyroscope equations

The strength of a gyroscopic effect is termed the gyroscopic moment. I use the symbol 'G', in units "Newton-meters/Hertz". A higher moment requires more torque to precess at the same frequency, or for the same torque precesses at a lower rate

Where a gyroscope receives torque on the primary axis and precession on the secondary, no work is being done. The torque 'T_P' on the primary axis has no precession associated with it, while the precession rate 'ν_S' on the secondary axis is...

$$\nu_S = T_P / G$$

...and has no torque associated with it. Since the rate of doing work on each axis is the torque times the precession *on that axis*, it follows that in this simple case no energy is involved.

Gyroscopes do not differentiate between primary and secondary axes - this is a purely artificial definition of my own. A torque on the secondary axis creates precession on the primary axis. Simultaneous torque on both axis will result in simultaneous precession. In this case each axes will have both torque (creating precession on the other axis) and precession (created by torque on the other axis). Then the rate of doing work 'P_P' on the primary axis is...

$$P_P = T_P . \nu_P / G$$

...and on the secondary...

$$P_S = T_S . \nu_S / G$$

Now by applying the conservation of energy...

$$P_P = - P_S$$

i.e. the work done on one axis must appear on the other.

So far I have dealt purely with behaviour, but to go further we need to look at *why* it behaves this way - what mechanism is at work? Let us go through the basic operation where torque on one axis creates precession on the other (those familiar with electric motor theory will be familiar with the following ideas).

First apply a forcing torque to the primary axis; at this stage in the argument imagine that the primary axis presents no stiffness against the forcing torque. The secondary axis would precess at an infinite frequency, but for a limiting mechanism that comes into play; just as torque creates precession, so precession creates torque. So as the secondary axis precesses it creates a reverse torque T_{PF} on the primary axis...

$$T_{PF} = -\nu_S.G$$

The precession rate always runs at that point where T_{PF} is exactly equal and opposite to T_P. At this point...

$$\begin{aligned} T_{PF} &= -\nu_S.G \\ &= -(T_P / G).G \\ &= -T_P \end{aligned}$$

The reverse torque generated by the precession exactly opposes the applied torque so that the net torque is zero. If it was more the work would be done by the gyroscope. If it was less the primary axis would give way under the applied torque and work would be done with no outlet for it. Both conditions violate conservation of energy principles.

To sum up, the gyroscope precesses the right rate on the secondary axis to exactly oppose the applied torque on the primary axis. This leads directly to an aspect of gyroscopic behaviour that is seldom experienced in conventional gyroscopes, but is important in the behaviour of electrons:- If the secondary axis is locked against rotation and the primary axis is driven, no opposing torque will appear on the primary axis - it is free to rotate without hinderance. No work is transferred through the gyroscope - there is motion without torque on the primary axis. The seconary axis has no motion - it is locked - but instead experiences a torque T_{SF}...

$$T_{SF} = \nu_P.G$$

This is the identical situation to basic gyroscope operation, but viewed from the other side. Instead of saying that torque on the primary axis leads to precession on the secondary we say that precession on the secondary axis leads to torque on the primary axis. It is exactly the same thing.

Using the equations

Now look at the special case of a gyroscope operating in an external linear field that serves to invert it through exactly 180 degrees. For example, when a table-top gyroscope whose bottom pivot point is fixed starts pointing upwards, the linear

vertical gravitational field of the Earth acts to invert it.

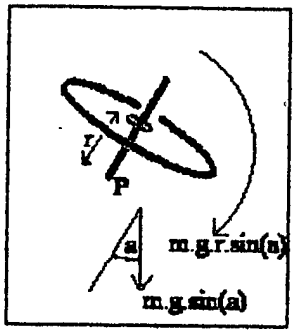


Figure 2

The gyroscope mass 'm' acts through the centre of gravity of the gyroscope. The vertical force is...

$$m.g.\sin(a)$$

...where 'g' is the gravitational constant of 9.81 meters per second. The torque around the gyroscope pivot point 'P' - and hence around the centre of mass - is...

$$T_P = m.g.r.\sin(a)$$

...where 'r' is the radius from the pivot point to the centre of mass.

This creates an *instantaneous* precession F_S that in Figure 2 will cause the gyroscope to precess out of the page at the top of the picture. The *instantaneous* rate of precession is...

$$v_S = m.g.r.\sin(a) / G$$

Now the reason for emphasising that this is the instantaneous rate, is that T_P is not a simple torque under the external linear field. As the gyroscope precesses out of the page, the angle the field makes with the gyroscope rotates with the precession. The end result of this is to cause the gyroscope's precession to be truncated into a circle whose circumference is normal to the field. The circumference of this circle is shortened to...

$$r.\sin(a)$$

...while the full precessional circumference would be simply 'r'. This means that it takes the gyroscope less time to trace out the circular path, so the actual foreshortened precession rate is corrected to...

$$\nu_S = (m.g.r.\sin(a) / G) / (r.\sin(a) / r)$$
$$= m.g.r / G$$
$$= T_{Pmax} / G$$

In other words the revised precession rate is constant.

Now if you experiment with a table gyroscope you will find that it will slowly droop as it precesses, so that the free end - opposite the pivot point 'P' in Figure 2 - will tilt more and more towards the table surface. It may seem at first that it is simply falling under gravity, but if you examine the motion you will find that the gravitational energy used up is not being translated into kinetic energy since the rate of droop remains slow and controlled. So we need to find out where the energy is going to understand the behaviour.

In fact it is simply precession! What is happening is this:- The torque produced by the gravitational field on the primary axis causes the precession on the secondary axis. However, the secondary axis has friction associated with its motion, and this creates a frictional torque on the secondary axis that in turn causes precession on the primary axis. Energy conservation tells us that torque times precession on one axis must equal the negative of torque times precession on the other, so that the sum of the two energy rates is zero.

The work done by the gyroscope in going from the straight-up to the horizontal position may be found by integrating the torque over this rotation, when it will be found to be numerically equal to T_P, but in joules of energy, rather than the T_P newton-meters of torque that creates the motion. So in the table gyroscope example, T_P joules of energy will have been lost to friction on the secondary axis when the gyroscope has dropped from the straight-up to the 90-degree orientation on the primary axis.

Full inversion from straight-up to straight-down involves $2.T_P$ joules. This leads to an important relationship. For any gyroscope the precession on the secondary axis is...

$$\nu_S = T_P / G$$

...and the work done in inverting the gyroscope from straight-up to straight-down in an external field is...

$$E = 2.T_P$$

...so the ratio of energy to frequency is...

$$E / \nu_S = 2.T_P / (T_P / G)$$
$$= 2.G$$

In other words, a given gyroscope moment G will always result in the same ratio of energy to frequency.

Another example is an electron in an external magnetic field. The electron has a

gyroscopic moment and a magnetic field.

Now the tabletop gyroscope has frictional losses and operates in a linear external gravitational field that serves to invert it, while an electron has electromagnetic radiative losses and operates in a linear external magnetic field that serves to invert it. In the former case the external field acts on the mass, while in the latter case it acts on the magnetic field of the electron. However, the maths is identical, with the electron's gyroscopic moment being h/2 ('h' being Plank's constant)...

$$E / v = 2.G$$
$$= 2.(h/2)$$
$$= h$$

...so as you can see Plank's constant owes nothing to the electromagnetic world - it is a purely gyroscopic property. The concept that the electron spin is 1/2 is related to its gyroscopic moment being h/2.

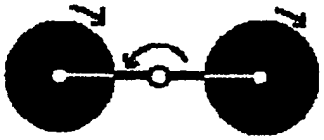
Although it is difficult to do for the table gyroscope, it is easy to reverse the process for an electron, to cause it to return from the straight-down (field alignment) position to the straight-up (field opposition) position. Just as a loss torque on the secondary axis causes the precession on the primary axis from straight-up to straight-down, so a gain or forcing torque on the secondary axis will cause precession on the primary axis back to the straight-up position. How this operates with the electron is beyond the scope of this paper, but it is possible to employ an electric motor integrated into the secondary axis of sophisticated gyroscopes to overcome and even reverse frictional losses.

Gyration

A final interesting characteristic appears when you put a spring on the secondary axis. As you drive the primary axis the secondary axis will at first precess and the primary axis will be stiff, but as the spring winds up you will find the precession slow down and stop, and as a result the primary axis will give way more and more until it rotates freely. This behaviour is that of an inertial torque on the primary axis. Equally, if you put an inertial torque on the secondary axis the primary axis will behave like a spring torque. This behaviour, where inertial torque is converted into spring torque and vice-versa, is termed *gyration*.

Removing the Gyroscopic Moment

If the equations for angular momentum and gyroscopic moment are truly independent, can we separate angular moment from gyroscopic moment in a flywheel? The answer is "Yes" - simply ensure the mass travels in a circular path, but does not rotate. Imagine a flywheel which is simply a frame that carries two masses which are free to rotate independently on their own axles...



Then add some gearing (not shown) that makes the two masses counter-rotate ***slowly*** in the opposite sense to the frame's rotation. This is at a much lower rotation rate than the frame's rotation, just enough to offset the small gyroscopic moment of the frame. With the right gearing the frame's gyroscopic moment will be annulled by the masses' counter-moment and you will have a flywheel with plenty of angular moment, but no gyroscopic moment.

Many other arrangements are possible – two full counter-rotating flywheels on the same sxis, for example

The application of such a device is to engines in high-performance machines. For example the engines in small aircraft have such a high gyroscopic moment that they can affect the handling of the aircraft, and longitudinally- mounted engines in racing cars can affect manoeuverability.

CONCLUSION

The fascinating behaviour of gyroscopes can be seen from the foregoing. It can also be seen that the electron's gyroscopic moment dominates the whole of Quantum Mechanics through Plank's constant, which is simply twice the gyroscopic moment.

ATTACHMENT C

Applicabl FAX TO AND FROM MS.LESLIE DUNCAN OF SMDC (US ARMY SPACE AND MISSILE DEFENSE COMMAND)

HAI

HARRISON A/E, INC..
226 Stonewall Road
P.O. Box 9475
Baltimore, Maryland 21228-0475, USA

FACIMILE TRANSMISSION COVER SHEET

Date: October 10, 2002

TO: Ms. Leslie Duncan
___SMDC Contracting and Acquisition Management Office
Fax: 1-256-955-4240
Telephone: 1-256-955-4027
LOCATION: US ARMY SPACE AND MISSILE DEFENSE COMMAND (SMDC)
CONTRACT AND ACQUISITION MANAGEMENT OFFICE
P.O. BOX 1500, HUNTSVILLE, ALABAMA 36807-3801

FROM: Wilbur E. Harrison
FAX: 410-747-9936
TELEPHONES: O: 410-747-9935; H: 410-747-8325
LOCATION: Harrison AIE, Inc.
226 Stonewall Road
P.O. Box 9475
Baltimore, Maryland 21228-0475, USA

SUBJECT: Your Telephone call and Fax today.

COMMENTS: Enclosed please find attached your Faxed Policy and Memorandum Of Understanding that is executed and signed by me, as you directed. I am well underway in the submission of my patent application for the Harrison Free Standing Towers to the USPTO (US Patent and Trademark Office). I shall forward to you a copy of said patent application shortly.

Thank you for your cooperation.

Sincerely,

Wilbur E. Harrison, P.E.
President

PAGES INCLUDING COVER: 3

Scanned Into: **Microsoft Word; Drive E; File: 2978B.htm**

10/10/02 THU 10:47 FAX P 001

Contracting & Acquisition Mgmt Ofc Date: 10 Oct 02

UNCLASSIFIED

FAX COVER SHEET

US ARMY SPACE AND MISSILE DEFENSE COMMAND
POST OFFICE BOX 1500, HUNTSVILLE, AL 35807-3801

TO: Mr. Wilbur E. Harrison **VOICE PHONE: 410-747-9935; F.AX PHONE: 410-747-9936**

FROM: Lisa Lindquist VOICE PHONE: [redacted]
SMDC-Contracting FAX PHONE: [redacted]

HEADER + 3 PAGES

REMARKS:per our telecon- please sign the MOU and return to me. Also, the ltr states the required documendation needed to process your unsolicitated proposal. Any questions or problems -- please call.

UNCLASSIFIED **P002**

10/10/02 THU 10:46 FAX

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND
POST OFFICE BOX 1500 HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF: Policy and Pricing Branch **08 OCT 2002**

Mr. Wilbur E. Harrison
HARRISON A/E, INC.
226 Stonewall Road, P.O. Box 9475
Baltimore, MD 21228-0475

Dear Mr. Harrison:

Your letter faxed in September 2002 has been received by this command.

Your ideas must be submitted in accordance with the Federal Acquisition Regulation. I am enclosing a copy of Memorandum of Understanding (MOU) that should be signed and returnedwith 3 copies of your proposal. Additional information for your assistance can be found on our website: www.smdc.army.mil/Contracts/Contracts

In accordance with the enclosed documents documents, the following should be included in yourunsolicited proposal:

a. Technical Information

(1) Concise title and abstract (Approximately 200 words) of proposed effort.

(2) A reasonably complete discussion stating the objectives of the effort or activity, the method of approach and extent of effort to be employed, the nature and extent of effort to be employed, the nature and extent of the anticipated results and the manner and in which the work will help to support accomplishment of this agency's mission;

(3) Names and biographical information on the key personnel who would be involved, including alternates, and

(4) Type of support needed from this agency, e.g., facilities , equipment,materials, or personnel resources.

b. Other supporting information

(1) Proposed price or total estimated cost for effort in sufficient detail for meaningful evaluati n;

(2) Period f time for which the proposal is valid;

(3) Proposed duration of the effort;

(4) Brief descripti n of your rganizati n; previous experience in the field, and facilities to be used; and

(5) Required statements, if applicable, about organizational conflict of interest, security clearances, and environmental conflicts.

One copy of your letter is being retained for our records. Thank you for your attention in this matter and we appreciate your interest in the U.S. Army Space and Missile Defense Command. In the future, please contact Ms. Leslie Duncan at (256) 955-4027 oncerning this action.

Sincerely,

GARFIELD W. BOON, JR.
Chief, Acquisition Management Division

Policy Statement and Memorandum of Understanding for the evaluation of Unsolicited Proposals for Contract

Prior to the Army's acceptance of any article of equipment, materal, or disclosure of information for evaluation or testing, the individual, firm, or corporation submitting such article, invention, or disclothure must understand and agree to the following policy. (Reference: Federal Acquisition Regulation Support 15.6 and Army Regulation 27-60, Chapter 3.

POLICY

(1) The Army has a continuing interest interest in receiving and evaluating proposals containing new ideas, suggestions and inventive concepts for weapons, supplies, facilities, devices, and equipment. Government employees and contractors are constantly engaged in research and development activities, however,and may already know the substance of your proposal. It may even be in the public domain. For such reasons we have found it desirable when receiving proposals for evaluation, to insure that the persons submitting themare aware of the conditions under which the Army may consider proposals for evaluation.

(2) You should understand that our receipt and evaluation of the proposal does not imply a promise to pay, a recognition of noveity or originality, or any relationship that might require the Government to pay for the use of information to which we are otherwise lawfully entitled.

(3) The Government will exercise due care to ensure that. Inin addition to the technical design or concept data submitted, any financial and management plans also submitted will not be used by the Government for any purpose other than for the evaluation of the proposal.

(4) The Army handles voluntary submissions in accordance with established Government procedures for safeguarding such articles or information against unauthorized disclosure. In addition, we shall not shall not disclose the data forming a part of or constituting the submission outside the Government nor shall we duplicate, use or disclose the data in whol or in part except for record purposes or to evaluate the proposal. This restriction extends to and includes financial and management-plan information submitted with, or forming a part of, the proposal. This restriction does not limit the Government's right to use the information in such data if we have obtained it from another source or if it is in the public domain. We may have proposals without restrictive markingsthat we receive from educational or nonprofit organizations evaluated outside the Government provided that the evaluatorsagree in writing not to reproduce, use or disclose the information inor in part except for the purpose of evaluation.

(5) The Army will furnish you with information covering the results of our evaluations or tests if you request.You may not construe the information as a Government endorsement of the articles or subject matter of the disclosure. You may not construe the information as a Givernment endorsementof the articles or subject matter of the disclosure . You may not use the information in whole or in part for advertising purposes with industry or other Government agencies.

THIS IS A LEGAL DOCUMENT. READ IT CAREFULLY AND BE SURE YOU UNDERSTAND IT BEFORE SIGNING

I, the undersigned, on behalf of myself, r Harrison A/E, Inc.....
Company or Corporation

have read the above policy statement and have made a disclosure of a proposal to the Department of the Army relating to HARRISON FREE STANDING TOWERS

It is understood that the Department of the Army has accepted the above proposal for the purpose of evaluating it and advising of any possible Army interest. Such acceptance does not imply or create a promise to pay, an obligation to give up any legal right, or assume any duty, a recognition of novelty, originality or priority, or any relationship established or otherwise, such as would render the Government liable to pay for or to give up any legal right or assume any obligation for disclosure or use of any information in the proposal. In fact, the Department would otherwise normally be obliged

WILBUR E. HARRISON — Wilbur E. Harrison
PRESIDENT — HARRISON A/E, INC. — 10 Oct 1982

Enclosure 2

ATTACHMENT D

HAI INITIAL LETTER F PR P SAL

HAI

HARRISON A/E, INC.
226 Stonewall Road
P.O. Box 9475
Baltimore, Maryland 21228-0475, USA

FACSIMILE TRANSMISSION COVER SHEET

Date: September 07, 2002

TO: Lieutenant General Joseph M. Cosumano, Jr.
Fax: 1-703-602-5036
COMMANDING GENERAL
US ARMY SPACE AND MISSILE DEFENSE COMMAND 1941 JEFFERSON DAVIS HIGHWAY, SUITE 900, ARLINGTON, VA 22215-0280
Telephone: 1-202-456-0280
email; joseph.cosumano@smdc.army.mil

FROM: Wilbur E. Harrison
Fax: 410-747-9936
TELEPHONES: O: 410-747-9935; H: 410-747-8325
LOCATION: Harrison A/E, Inc.
226 Stonewall Road, P.O. Box 9475
Baltimore, Maryland 21228-0475, USA

SUBJECT: Cruise Missile and ICBM Defense System For The USA.

COMMENTS: Please see my attached letter, Thank you.

Sincerely,

Wilbur E. Harrison, P.E.
President

NUMBER OF PAGES INCLUDING COVER: 9
Microsoft Word; File: 2980E.htm; Saved in HD E, CD-RW #1 & CD-R #1

HAI

HARRIS N A/E, INC. *

MILITARY PROJECTS, ARCHITECTS, ENGINEERS, CONSTRUCTI N MANAGERS AND CONTRACT RS

ENTERPRISE S FTWARE-C MPUTERIZED CORP RATE MANAGEMENT SYSTEMS

RESEARCH AND DEVELOPMENT: MILITARY DEFENSE, MEDICAL AND ENVIRONMENTAL PRODUCTS

226 Stonewall Road
Baltimore, Maryland 21228-0475 USA

INTERNET SITES: http://www.harrison-ae.com;
http://www.HAIholdings.com;
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September 07, 2002

LIEUTENANT GENERAL JOSEPH M. COSUMANO, JR.
COMMANDING GENERAL

US ARMY SPACE AND MISSILE DEFENSE COMMAND
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General Cosumano:

This is an upgrade to my earlier proposal, dated 08/27/02, that contains later applicable information that has come to my attention.

I am very concerned about the recent news clips listed below:

1. Cruise Missile Threat Grows, Rumsfeld says.
2. Defense Chief Outlines Challenges of Information Age Warfare.
3. DoD Seeks to Bolster Cruise Missile Defenses.

(Attachment A to this letter is a copy of the above news clips)

My company and I have the design to build high Free Standing Towers that can be built, depending on tactical and strategic requirements, to a height of 1000 to 5,000 feet, or higher if required, that are capable (when suitable radar and defensive weapons are installed) of the following:

1. Th y can defend the USA from Cruise Missile and ICBM's; and th y an als improv th curity f USA borders again t drug traffi and th r incursi n .

2. They can support Radar Antennae, for a Missile Defense System. designed to protect the USA from an attack by cruise missiles, ICBM's, manned aircraft and drone aircraft carrying nuclear bombs, biological weapons or other terrorist weapons. These towers shall enable the USA to, cost effectively, provide multiple points of triangulation to locate more positively any and all incoming missiles and aircraft and thus better direct USA defensive directed-energy weapons, missiles and other defenses to intercept and destroy hostile incoming missiles and aircraft. In other words, these towers would provide the low cost option for positioning systems where continuous look-down surveillance as well as look-up surveillance, look over the natural horizon and high power requirements are a major consideration.

If requested to do so, I would propose the use of an improved version of the pulse doppler AWACS radar, which my firm and I would develop (via a subcontractor) during the same one year or less time frame as building the full scale working model of the free standing tower .

3. I have sound technical reason to believe that my free-standing towers, at some significant height, are transportable to a foreign theater of operations via ship, such as a large container ship or otherwise.

4. My towers could support the weight and provide the large electric power requirements for DEW (Directed Energy Weapons) such as HEL (High Energy Lasers) and other such weapons.

5. These towers can produce significant quantities of green electric power that shall render the cost of building and maintenance of these towers to be very cost effective.

My firm has executed some 346 AE projects, the majority of which were done under contract with DOD Agencies. Our experience is summarized in ur Website: (http://www.HAIholdings.com), in the Architecture & Engineering page of the Website. Also, I have significant personal xperience in the development of the first PD (Pulse Doppler) Radar and Fire Control System produced for the DOD, while employed by a major defense c ntract r, a shown in my Web ite: *(http://www.*enterprise oftware-m .c m) .

I served in th USAF hortly aft r I graduated from V MI (Virginia Military Institut) in 1950. My USAF erial number i A 1862396; my SS numb r is 223 30 1918. Th USAF required m , nd many of my classmates, to take and pass a graduate level course in Nuclear Physics (including the effects of nuclear weapons) at Sandia Air Force Base, as well as a course in HE (high explosives). I was then assigned as one of the cadre to form a new Special Weapons Squadron, which we successfully accomplished. Our squadron was then deployed to Rapid City, SD. Accordingly, I well know that even a single nuclear bomb detonated on any one of our major cities means American casualties in the millions, rather than the thousands that we suffered on 911. Thus, I respectfully suggest that you and the DOD consider funding my firm to build a full-scale working model of a Free Standing Tower to demonstrate the use and effectiveness of this approach. This defense system is compatible with the satellite-based system being developed by the BMDO. I believe that a full-scale working model can be completed in a year or less, by my firm. I fully expect that we shall need said Missile Defense System within four years, or less, to defend against terrorist attacks. If I can contribute to this effort, I shall consider it to be an honor .

As you were quoted in the press in the Attachment A to this letter "we ought to balance our capabilities.. to meet both missile threats". I hereby respectfully propose to do just that.

I shall be pleased to forward to your office a more detailed proposal. I also stand ready to meet with your staff and show hard copy proof of my involvement in the development of the first Pulse Doppler Radar for military use.

Thank you for your consideration,

Sincerely,

Wilbur E. Harrison, Jr., P.E. President

Please see Attachment A

* Our other active Corporate names are: Harrison Associates, Inc. and HAI Holdings, Inc.

---------- ATTACHMENT A ----------

1. Cruise Missle Threat Grows. Rumsfeld Says
2. Defense Chief Outlines Challenges of Information Age Warfare
3. DoD Seeks to Bolster Cruise Missile Defenses

Washington Post Sunday, August 18,2002 Page A01
Cruise Missile **Threat** Grows, **Rumsfeld** Says Defense Secretary Donald H. Rumsfeld has sent the White House a classified memo warning of the spread of cruise missiles among hostile nations and urging an intensified government-wide effort to defend against them. The memo, delivered last month, reflects heightened concern by Rumsfeld and senior aides about the ready availability around the world of cruise missile technology and the continued vulnerability of U.S. troops and population centers to attack by the low-flying, hard-to-detect weapons, according to officials familiar with the memo. The Bush administration has made development of anti-missile systems a top priority .But its focus has been on defending against ballistic missiles, which arc through the sky after launch and tend to be bigger, more costly and longer range than cruise missiles, which are self-propelled, lower-flying and more transportable, therefore posing a different set of defensive challenges. Capable in some cases of taking off from ships close to shore and maneuvering below radar scanners or behind terrain, cruise missiles present a particular worry as potential platforms for delivering nuclear, biological or chemical warheads. Rumsfeld's new emphasis on these weapons suggests an attempt to broaden the administration's anti-missile effort and take them more aggressively into account. Defense officials are particularly worried about the possibility that terrorist groups or countries such as Iraq and Iran could use rudimentary cruise missile technology to attack U .S. installations or the American homeland. "The issue has gotten people's attention, " a senior administration official said. "It's something that has recently bubbled to the surface as a result of Rumsfeld throwing it out for discussion. " In the wake of Rumsfeld's two-page memo, entitled **"The Growing Threat Posed by Cruise Missiles,"** the National Security Council convened an interagency "working level" meeting this month to sort through "how to get our hands around the issue and figure out who wi11 take the lead on what aspects, " the senior official said. Officials declined to release the memo or describe its contents in detail. Another official familiar with Rumsfeld's thinking said no particular piece of new intelligence prompted the warning. Rather, he said, the intensified concern stems from an "accumulation" of evidence showing increased interest in cruise missiles by foreign adversaries and easier access to small gas turbine engines, precision navigational devices, high-resolution satellite imagery and other technologies useful for powering or guiding such weapons. "It is enough to suggest we need to pay more and better attention to the problem than we have thus far," the Rumsfeld aide said. At least 81 countries are reported to have cruise missiles of some kind, totaling more than 70,000 weapons, although the vast majority are designed to go against ships at distances of less than 60 miles. Of greatest concern to U.S. officials are "land-attack" cruise missiles, which are produced by only a few major industrialized nations. Among the most sophisticated of these is the U.S. Tomahawk, a highly maneuverable, terrain-hugging missile that has become the nation's weapon of choice for hitting fixed sites in Iraq, Afghanistan, the Balkans and elsewhere without risking the lives of American pilots. In fact, the pinpoint accuracy and devastating effect of the Tomahawk has heightened foreign interest in pursuing cruise missiles, officials said. The U.S. intelligence community predicts that a dozen to two dozen countries will have land-attack cruise missiles by 2015. But the most advanced capabilities evident in the Tomahawk --such as radar-evading features, ramjet propulsion and in-flight targeting --still appear far out of reach of most potential competitors. What worries U.S. authorities is the prospect of such states as Iraq, Iran or North Korea or such terrorist groups as al Qaeda taking existing aircraft or anti-ship missiles and converting them into unmanned drones that could function as crude but still very deadly cruise missiles. "Your car has in it all the sophisticated technology that's necessary to feed a little actuator inside of a guidance system to make a missile fly more or less where you want it to go," the Rumsfeld aide said. "If you can buy it in your automobile, you begin to get a sense ofhow practical it is for those kinds of weapons systems to be developed." Iraq, for instance, is known to have worked on turning Czech L-29 trainer aircraft into unmanned vehicles for delivering chemical or biological agents. "It's fair to say that the Iraqis may well have a rudimentary capability [for remotely piloting an aircraft], but it's likely that they are continuing to attempt to improve that capability," said a government official who follows cruise missile development. Similarly, the Japanese cult Aum Shinrikyo was reported to have tried several years ago to obtain a remotely piloted helicopter to disseminate chemical agents. "We see this as a potential near-term threat, a poor man's cruise missile --a UA V acquired off the shelf and then modified to deliver chemical or biological agents," the official said, using the abbreviation for unmanned aerial vehicle. "We have every reason to believe that terrorists could try to acquire or obtain this capability ." The U.S. government's most recent unclassified assessment of foreign missile developments, issued in December, said "many countries" see cruise missiles as a "better alternative" than ballistic missiles for attacking the United States, in large part because such weapons can be launched nearer to U.S. territory from commercial ships. This would not only shorten the delivery time of the missiles but also help obscure their origins. "We're not just talking about hypothetical situations," said the official who follows the subject. "We have reason to believe that folks are starting to look at this kind of capability ." To defend against cruise missiles, the Pentagon relies on a patchwork of surveillance systems and an assortment of interceptors flred from land, sea or air platforms. Detection is complicated by the tendency of cruise missiles to generate radar profiles similar to friendly aircraft. Much of the defensive challenge has involved figuring out how to link the various detection systems -- Air Force A WACS and Navy E-2C aircraft, ship-based Aegis scanners and land-based radars --and form a "single integrated air picture" to more easily distinguish friendly aircraft from threatening ones. Some experts have advocated a central airborne system that would provide longer-range surveillance and guide ground or sea-launched interceptors now handicapped by their own horizon-limited radars. "The problem

with cruise missile defense is it needs an integrated, interservice approach but has remained spread among the services," said Dennis Gormley , a senior fellow at the London-based International Institute for Strategic Studies. **Lt. Gen. Joseph M. Cosumano Jr., head of the Army Space and Missile Defense Command, complained in a speech last month about the absence of a single Pentagon agency to coordinate development of cruise missile defenses the way the Missil Defense Agency oversees work n anti-ballistic missile systems. "We ught to balance ur capabilities" to meet both missile threats, Cosuman said. But rather than create an agency or apply significantly more money to the problem, the Pentagon is likely to try improving coordination among programs already underway, the Rumsfeld aide said. Military planners have spent the summer drafting a broad study on cruise missile defense ordered in May. And a Joint Staff organization chartered six years ago to address the cruise missile** threat has been given expanded responsibility to develop anew operational concept for homeland air defense. Other government agencies, notably the Commerce Department and the Federal Aviation Administration, also will have to help, defense officials said. "If we're going to deal with this --and we are --it's going to require a government-wide effort, " the Rumsfeld aide said. Among other useful moves, several experts said, would be to tighten proliferation controls under the Missile Technology Control Regime. Established in 1987, the MTCR was supposed to apply equally to ballistic and cruise missile programs. But a lack of controls on sales and production of manned aircraft has created a large loophole, enabling countries to disguise their cruise missile pursuits behind seemingly legitimate aircraft purchases or manufacturing.

National Journal's Technology Daily August 16,2002
Defense Chief Outlines Challenges ofInfonnation Age Warfare
The increasing availability of commercial, off-the-shelf technology to terrorist groups and enemy states are creating new challenges for the U.S. military, Defense Secretary Donald Rumsfeld said Thursday in his annual report to the president and Congress. "Maintaining the U.S. technological edge has become even more difficult as advanced technology has become readily available on the world market," Rumsfeld wrote. "Technologies for ~nsors, information processing, communications, precision guidance, and many other areas are rapidly advancing and are available to potential adversaries." Rumsfeld said some adversaries are using those high-tech tools to develop "offensive information operations" that could disrupt military information systems, such as those that enable U.S. troops to engage in "network-centric" warfare with other combat units and foreign allies. "In a networked environment, information assurance is critical," Rumsfeld said. "Information systems must be protected from attack, and new capabilities for effective information operations must be developed." Noting thatnetwork-centric warfare relies heavily on satellite communications and other forms of space- based technology, he said the U.S. military must be vigilant in preventing terrorists and enemy states from gaining access to space. "No nation relies more on space for its national security than the United States," he said. "Yet elements of the U.S. space architecture-ground stations, launch assets and satellites in orbit-are threatened by capabilities that are increasingly available." Rumsfeld said the fiscal 2003 Defense budget would provide $2 billion to improve the security of the department's space-based information and intelligence systems. That would be a 15.6 percent increase over fiscal 2002 spending. He added that the Pentagon also plans to invest about $200 million in space- related "transformation" programs in fiscal 2003, "with significantly more planned in the future." "Transformation" refers to the military's efforts to redefine its approach to warfare, by moving from the industrial age to the information age, and shifting its defense strategy from the predictable threats of the Cold War to unpredictable, "asymmetric" threats such as those posed by the al Qaeda terrorist network. Rumsfeld said transformation initiatives would be funded at about $21 billion in fiscal 2003, which would be about 17 percent of Defense's total spending on procurement and research and development programs. He added that the investment would rise to 22 percent by fiscal 2007. Defending the nation against high-tech, asymmetric threats also requires a "robust" investment in science and technology (S&T) programs, according to Rumsfeld. "U .S. armed forces depend on the department's S&T program to deliver unique military technologies for the combat advantage that cannot be provided by relying on commercially available technology," he wrote. The Pentagon's fiscal 2003 budget would provide $9.9 billion for S&T programs. That would be about 2.7 percent of next year's total Defense budget. but Pentagon officials have said thev hope to increase that investment to 3 percent in future years.

Jane's Defense Weekly September 4,2002
DoD Seeks to Bolster Cruise Missile Defences
The US Department of Defense (DoD) is spearheading a programme to bolster the ability to defend the homeland against cruise missile attacks, as part of a broader effort among 19 federal agencies to protect North America from air threats. However, even with the attention homeland air defence is receiving following the 11 September 200 1 terrorist attacks, funding for the programme remains a stumbling block, according to one senior DoD official. "There has been a lot of talk, " the official said, yet cruise missile defence (CMD) of North America remains essentially an "unfunded requirement" .Infonned estimates say an effective architecture of sensors and interceptors would be a multi-billion-dollar effort. CMD is not a new mission, but current capabilities are not geared toward more likely scenarios like a single, low-flying stealthy cruise missile launched from a ship off the US coast. The Canadian-US North American Aerospace Defense Command (NORAD) has been working for years to defme the requirements for North American CMD in the post-Cold War environment, in which the threat of small- scale attack from rogue or even non-state actors has eclipsed the fear of a massive Soviet air assault. "NORAD requirements are fmally getting recognition, " said the senior DoD official. After much co- ordination and deliberation, the DoD, working with the other agencies, has drafted a concept of operations (CONOPs) for 'homeland air security', including CMD, which is now under White House revIew.

The DoD is hopeful that the plan will generate resources. "We are looking for help from OMB [the president's Office ofManagement and Budget} in '04," said the official. Cruise missiles have been the 'other' missile threat to the US homeland, receiving less attention in policy debates on post-Cold War security risks than the spectre of long-range ballistic missiles. yet they are a threat that is growing, according to US defence officials. Land-attack cruise missiles, even unsophisticated variants, in the hands of so-called rogue states or terrorist groups could offer an accurate means of delivering a biological, chemical or nuclear payload due to global positioning system guidance and an inherently stable aerodynamic platfonn. There are about 140 types of cruise missiles today, some 70% of which are shorter range anti-ship systems, according to Ken Knight, defense intelligence officer for global trends in the Defense Intelligence Agency. Conversely, about half of the 120 systems under development will be land-attack systems, he said. The CIA's unclassified December 200 1 National Intelligence Estimate on missile threats facing the USA up to 2015 states that "one to two dozen countries probably will possess" land-attack cruise missiles by 20 15 "posing primarily a theater-level threat -but with sufficient range to be forward-deployed on air- or sea-launch platfonns" (Jane's Defence Weekly 16 January). Further, the report noted that "cruise missiles are a better alternative than ballistic missiles in launching from forward areas" from a technical standpoint. "Many countries would therefore see these missiles as advantageous in attacking the United States." A covertly equipped commercial vessel would make the "most plausible alternative". Long-range persistent surveillance and integrating sensors with fire-control are principal CMD challenges, US defence officials say. Current air-to-air and surface-to-air missiles can destroy the threats if there is sufficient time for the defence to react, they say. NORAD radars, which are oriented outward from North American territory, are not geared to detect low-level threats. Prior to last year's terrorist attacks, NORAD did not have an internal air picture of North America and its sensors were not linked with those of the Federal Aviation Administration, which had responsibility for controlling internal air traffic. Efforts to link these assets since the attacks have increased situational awareness, but holes in coverage remain, principally against low-altitude threats, due to "clutter and non-optimal positioning", said the DoD official. Further, a similar link-up has not occurred with Canadian radars. "Since 11 September, we have hooked up all of those interior radars as best we can, but that does not really help you against cruise missiles," said USAF Brig Gen Rick Lewis, director of the DoD's Joint Theater Air and Missile Defense Organization. A space-based radar system is likely " a couple of decades" away and maintaining constant Airborne Warning and Control System (AWACS) aircraft patrols has proved untenable. One promising near-term solution is high-altitude airships equipped with radar that could see out hundreds of miles to provide such vigilance, said Gen Lewis. The US Army intends in Fiscal Year 2003 to launch a demonstration of a 70ft stratospheric airship with a 4,000lb (1814.4kg) payload capacity that is applicable to both CMD and ballistic missile defense. Other options are to deploy more Tethered Aerostat Systems, which currently watch for drug traffickers on the US southern border, or to field an initial version of the army's Joint Land-Attack Cruise Missile Defense Elevated Netted Sensor system -a more advanced and robust tethered aerostat under development that will carry sophisticated radars when fielded later this decade. Another key is establishing the means to share intelligence data between the 19 agencies and transcending technological impediments and parochial attitudes. The homeland air security CONOPs includes the creation of a 'Homeland Air Security Co-ordination Centre' to lead joint planning of inter- agency operations, said Gen Lewis. "We think this is what we are going to have to set up. ..to share and co-ordinate information and make all this happen and break down those barriers, " he said. There are also plans to establish a 500km surveillance zone around North America to monitor all incoming air traffic and a 200km maritime surveillance zone beyond it. Eventually, plans are to extend the air zone to 1,000 km.